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ABSTRACT

Job training is a powerful tool for growth, but only if embedded in a climate of pro-growth policies that it complements. To attract capital to create growth and jobs, a country has to offer favorable supply side conditions. A skilled labor force is one of several important supply side categories, whose growth effects are strongest when the other supply side conditions are favorable as well. Four reasons for paying special attention to human capital are as follows: trying to be as good as the best; higher wages justified by higher productivity; capital-intensive, labor-saving, technology-intensive production processes that require highly skilled labor; and an educational continuum for those willing to work for lower wages and the academically trained high achievers and everyone in between. German vocational training is a mass apprenticeship system run by the private sector within a public-private partnership. Trainees in all sectors of the economy usually begin training right after leaving school. Youth training is the best unemployment insurance and the best weapon against youth unemployment. It works best when it is work-based, performance-oriented, structured learning. The vocational system must not foreclose the option of apprentices to go to college. Germany is currently building a new system that combines academic and practical training and fills the gap between traditional vocational training and the university--the Berufsakademie (professional academy). A variant is already practiced in Singapore. (Eleven tables are appended.) (YLB)

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The German Approach

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School-to-Work Transition and High Performance:

The German Approach

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Wilfried Prewo **June 1994**

School-to-Work Transition and High Performance: The German Approach

From the United States to Europe and Latin America to Asia, economic policy discussions center around employment growth and, particularly, its dependence on skilled labor. Skills make for new and permanent jobs, "smart jobs" are a key to economic growth.

For a long, too long time, a skilled labor force had been considered a growth factor of only marginal importance. Currently, the pendulum has swung in the other direction: Politicians that want to avoid the hard choices of cuts in entitlements, taxes and budget deficits are discovering job training as the painless cure-all that can overcome sluggish growth, create employment, make the economy innovative and more competitive. This is expecting too much. Job training is a powerful tool for growth, but only if embedded in a climate of pro-growth policies, to which it is a complement, not a substitute. It is necessary to place job training into the proper framework:

Work on the Supply Side

Only capital invested can create growth and jobs. And to attract capital, a country has to offer favorable supply side conditions over a wide range:

- constitutional protection of property rights and a rule of law;
- a stable, convertible currency;
- open markets that are not overly restrained by regulation, protectionism and other government interference;
- attractive tax rates and "lean" government;
- a good infrastructure, and - last not least -
- an educated, skilled labor force.

It is in this context that the effect of human capital on growth should be discussed: a skilled labor force as an important, but one of several important supply side categories, whose growth effects are strongest when the other supply side conditions are favorable as well.

There are hardly any or, for that matter, there is no country that is excellent in all of the above supply-side categories. What does matter, then, in attracting scarce capital, is to be superior in some weighted average and to more than offset weaknesses in one area by strengths in others. The title of "king of athletics" is not reserved for the sprinter or long jumper, but for the decathlon champion.

And - what becomes more and more evident in a world in which competition for scarce capital has increased: It is important to continuously improve. You cannot win the gold medal in figure skating in 1994 with a perfect repetition of your 1988 program. It is not enough to once attain a good level and then just stay there. If some countries are improving their supply side conditions by, for example, lowering taxes or deregulating, other countries have to improve as well, unless they accept falling behind. If Toyota improves, Volkswagen must do so as well. The concept of "benchmarking", accepting the best performer in an industry as the standard which its competitors have to emulate, also applies to countries.

Labor training requires a long run perspective

Benchmarking, trying to be as good as the best, is one of four reasons for paying special attention to human capital: While lowering taxes or deregulating requires political consensus which may be hard to achieve, the time to implement such policies can be short. After the respective law is passed or the decree is issued, you have the new standard. Not so, unfortunately, when trying to build a skilled labor force. It is not just a question of political willingness. It takes an awful lot of time. Let me refer once more to the sports example and view the international competition

in supply side factors as a decathlon: lowering taxes might be the 100 meter sprint - requiring a burst of political energy; privatisation is the 110 meter hurdles - again, lots of one-time energy and skill to overcome obstacles, and that has to be done quickly. In contrast, building a skilled labor force is the less spectacular 1500 meter run that requires endurance, determination and staying power. And that is why it is better to start today than tomorrow in building a highly skilled labor force.

The pressures of an open world: High pay for high performance only

Second, the weight attached to human skills as a factor of growth has been increasing. Our world has an abundance of countries with unskilled labor at low wages. If a country tries to attract capital on that basis, it has to compete against all sorts of other countries. And if it does succeed, it will not retain its low wage advantage for long, since growth is not an end in itself, but a means to give people a higher per capita income. Higher wages, however, can only be justified by higher labor productivity.

Both Germany and the U.S. are observing that, with freer trade, high wages cannot be justified if not matched by high performance. With the Iron Curtain drawn open, a lot of German jobs are being lost to Eastern European countries, such as the Czech Republic, where wages stand at roughly 10 % and the productivity of a well-trained, highly motivated labor force at about 50 % of the German level. Likewise, the United States is going to feel the effect of NAFTA at the low skill and wage level.

As in Germany, wage increases in the U.S. can no longer be justified by U.S. productivity advances alone. As new players and new teams enter the league, you have to be better than them to command higher wages; you cannot expect a pay raise on the sole basis of your own or your team's record during the last season. In an open world, countries will even suffer wage or employment declines despite productivity advances, if the latter do not outweigh the productivity-wage differential of new competitors.

This is happening in Germany vis-à-vis Eastern Europe. We need dramatic productivity advances to compete with the emerging markets at our doorstep.

Productivity or "performance" can be raised by investing in technological advances. In this context, capital is a substitute for labor. While the productivity of those still employed rises, the rest might become unemployed and fall back into the low wage trap, a typical situation for countries with high population growth.

Hightech requires high skills

This leads to the third point: labor is not just a substitute of, but also a complement for capital. Product and process innovation make this point more and more important:

- An oriental rug must be hand-made.

- An analog telephone can be assembled with labor, if it is cheap.

- But the production of a modern digital telephone cannot absorb the same amount of jobs, no matter at what wage.

- And if you produce integrated circuits you must fully automate.

Yet, while technology-intensive production processes are capital-intensive and generally labor-saving, they require skilled technicians and machine operators. If you want to grow in technology-intensive industries, you have to generate a highly skilled labor force. The question is no more just to attract investment that absorbs the labor force. Increasingly, the question is what type of labor force we need to sustain growth and further investment.

Two observations: The availability of a skilled labor force - or, where absent, job training programs - recently played a key role

in attracting German companies such as BMW, Bosch or Mercedes-Benz to the south or southeast of the United States.

Second, you not only need high skilled labor to produce high-tech products, but you won't be able to sell them if your customers don't have a highly trained workforce: A few years ago, German and Swiss producers of textile machinery told me that their machines have become so technically advanced, so refined and high-tech, that they had trouble selling them in the United States for a lack of good machine operators and service mechanics there. (No problem with people trained in electronics.) Asked how they did in India, the machinery producers responded that there they had no problem at all, as India had great textile engineers that work as machine operators, although they might even be overqualified in that task.

Make the best out of everybody...

However, and this is the fourth point, we must not lose sight of those people in the middle of our societies. Not everybody can become an engineer or a doctor. India may be an illustrative, though negative, example here as well. We must absorb and give a chance to those that are not - intellectually or financially - able to go to a university. A well-paid, well-trained middle class of blue and white collar workers generates benefits in the form of social and political stability.

Furthermore, there must be upward as well as downward mobility. And mobility must be solely dependent on the individual's contribution to national income. It is alright to have an unequal distribution of income as a result of people's work. That entices others to try harder as well. But it is not alright to have unequal opportunity at the outset. Access to education and training are key elements of a society offering equal chance.

...not just out of the best and forget the rest

The United States has a world class university system and offers its high achievers a smooth transition from high school to college

and then to work. But anybody that does not graduate from high school or does not enter or graduate from college may face severe problems. Society seems to have nothing on offer for these persons and provides no guidance, making them feel unsure, directionless, and often even useless. By not offering them a seamless school-to-work transition the United States is wasting the huge practical potential of many young people. On the other hand, there is a huge demand for well trained, non-college educated office and industrial workers. While we do need both those that are willing to work for lower wages and also the academically trained high achievers, the educational and training system must not only address the job needs at either Wendy's or Wall Street. It is the continuum between these end points that requires most of our attention. You may score in the end zone, but you win the game in midfield.

The German system of vocational training

Having said that, I want to explain and highlight some of the salient features of the German system of vocational training. First of all, I want to stress that this is a system, not a set of well-intentioned programs.

Worldwide, Germany sets the benchmark in the area of vocational training. Its powerful contribution to productivity becomes all the more evident when recognizing that Germany has allowed a deterioration in its other supply side conditions: It holds the lead or is a close runner-up in

- income taxes,

- wages (about 20 % higher than in the U.S. as the industrial world's standard for comparison), as well as

- indirect labor cost (nearly triple of the U.S.), owing to soaring social security and health costs, short work weeks (38 hours on average), long vacations (typically, 6 weeks); annually, 1,520 hours are worked in Germany vs. 1,860 in the

U.S.; this makes German labor cost per hour about 60 % higher than in the United States.

In spite of this onerous handicap, German industry (still) is competitive as evidenced by Germany's overall export performance or market share, or technological leadership in key industries, especially investment goods. The cause of German productivity is its highly skilled labor force, which, in turn, is resulting from systematic youth training: Some 66 % of the German labor force are certified graduates of this system.

A mass system

Apprenticeship in Germany is synonymous with vocational or youth training: Right after leaving school, between the ages of 15 and 19, 572.000 teenagers have, in 1993, started an apprenticeship program lasting two to three years. This is more than double the number of new students. 1.6 million young people, or 6.5 % of the labor force, were enrolled. Who does not enter this program? First, those that directly enroll in universities or some other formal training. Second, a few of the secondary school graduates are short-sighted and immediately seek an unskilled job. But these amount to less than 5 % of all school graduates.

Run by the private sector...

With 1.6 million young people involved, the German youth apprenticeship system may be large, but it is not a government-run program. It is based in the private sector. Training is mostly work-based. The typical apprentice spends four days a week on the job in his training company and one day in a public vocational school. Theoretical training is adequate, but practical training has the upper hand. Apart from the federal German states funding the schools and national law setting broad guidelines, the government is not involved. This point is crucial (Table 1).

...within a public-private partnership

In the absence of government, an institution has to organize the system and act as a go-between for apprentice and firm. There has to be quality control, examination and certification by a neutral body. In Germany, this is done by the Chambers of Industry and Commerce for industrial, office, trade, and service sector jobs. (The Chambers of Crafts do the corresponding work for craftsmen, e.g., carpenters or bakers.) The regional chamber acts as a quasi-governmental institution, but, since solely funded and controlled by its member firms, has private sector needs in mind. The chamber registers the apprenticeship contracts, checks on companies and certifies their supervisors, regulates the program within the broad curricular guidelines, supervises the program, settles disputes, organizes midterm and final exams, establishes examination boards staffed by volunteers, and issues nationally recognized diplomas.

In the Hannover Chamber of Industry and Commerce (a region with a population of 2.6 million and 911.000 employees), there currently are 25.000 apprentices in 166 occupations (16.100 white, 8.500 blue collar), 4.800 firms that are active in training, 6.000 volunteer examiners (employers, employee representatives, some teachers), and 7.400 supervisors (Meister etc.) actively engaged in work-based training in their companies. In 1993, this chamber administered over 12.400 final exams of which 11.100 passed, and enrolled 10.600 new apprentices. (The numbers are currently declining due to demographic trends.) Of a total chamber staff of 211 in Hannover, 33 work in the training department (Table 2). The chamber charges a fee covering the full cost of its services. Depending on the occupation (examination materials for blue collar jobs are costly), the one-time fee for the entire training period varies from $ 200 to $ 600. There is no way that the government could beat that.

Trainees in all sectors of the economy

Before beginning their training, teenagers leaving school sign an apprenticeship contract with an employer who will train them for two to three years in any one of some 380 occupations: 36 % become craftsmen (for example, carpenters or bakers), 22 % industrial blue collar workers, (for example, machinists or chemical lab assistants), 32 % are in office, trade and other service sector occupations (salespersons, secretaries, bankers), 8 % in the public sector, and 1 % in agriculture (Table 3; Table 4 gives an overview of a typical office and industrial training occupation). Apprentices receive a salary or allowance, typically ranging from $500 to $800 a month, or 25-35 % of the salary of the respective certified employee who has "graduated" from that apprenticeship program.

Training is an industry-wide effort. Many companies, large and small, are involved. Smaller companies even have a higher ratio of apprentices to total employees (Table 5).

Straight from school to training to work

In most cases, training is begun right after leaving school. Thus, there is a seamless transition from school to training and then to work in Germany. Contrast that with other industrialized countries, where many school graduates that do not enter a university often seem to aimlessly switch among various low-wage jobs. By their mid-20's many of them still have not climbed up the job ladder, while their German counterparts hold well-paying skilled jobs by then. German youth and their companies have a 5 to 10 year head start.

Yesterday's trainees become tomorrow's trainers

In their late 20's, or typically 5-8 years after having been certified, about 10 % of the ex-apprentices go on for voluntary further training. This is the cream of the crop in terms of ability and ambition. In the evening and on weekends, they train

to become supervisors, either in the office or as master mechanics in factories. (In 1992, the German chambers of industry and commerce certified about 17.199 "Meister" in industrial and 17.204 in office jobs.) It is this group that, apart from being foremen and supervisors, also will train the apprentices in the workplace. This way, the circle is closed (Table 6).

This points to the condition that, in starting an apprenticeship system, any country first has to generate the trainers. Training the trainers must precede training the trainees. Countries neglecting that and trying to short-cut the first step will never get a high-quality system going. Inadequately qualified trainers contaminate the system like a computer virus and will eventually lead to failure.

Society wins: Training and unemployment

Good training is good labor policy: First, youth training is the best unemployment insurance. In September 1993, the German unemployment rate was 7.4 %. For those with occupational training, it was only 5.7 % (Table 7), and for the supervisors with further training, such as the "Meister", it is only 4.9 %. (The rates of September 1993 reflect the German 1992/93 recession: for comparison, in May 92, the overall rate was 6.2 %, 4.3 % for those with occupational training and 2.6 % for Meisters, even below the university educated with 4 %.) Viewed from the other side: Although the share of people without formal training in the German labor force is relatively small, they make up nearly half, or 46.5 %, of the unemployed.

Second, youth training is the best weapon against youth unemployment. In Germany, youth unemployment (25 and younger) in 1993 was 4.9 %, well below the overall rate of 7.3 % (Table 8). In all other EC countries as well as in the U.S. or even Japan, youth unemployment is considerably higher than, often more than double (U.S. or France) the overall rate. In the E.U., the corresponding rates are 20.1 % for the young, 10.5 % overall despite the dampening effect of the German rates. As youth unemployment is the

breeding ground for criminal behavior and political radicalism, youth training has high external benefits to society as a whole.

Training must be work-based

Youth training works best when it is work-based, structured learning by doing. In small firms, apprentices work on the main shop floor from day one. In larger firms, they may spend the first year in training facilities separate from the main shop-floor. In their second and third years, they are phased into the production process, and in these years they truly earn their salaries. Being integrated into a real-life workplace seems to motivate young people best. Which teenager, especially if less-gifted, does not have doubts about the "relevance" of high school algebra? Teenagers regard work as real, and thus take it seriously. Even the math or foreign language they have to suffer through in their vocational training as mechanics or secretaries does have some "real-life" meaning to them. Second, in the workplace, young apprentices are not separated from adults nor are they just taught by adults. They are among adult workers. Apprentices view their foremen and trainers more as mentors than teachers, knowing that, in a few years time, they themselves can reach that level.

Having already been in the work-place as an apprentice, the transition to a regular job after the program is smooth, apart from a hefty jump in pay.

An important advantage of a work-based system is that contents and curriculum change with technology. New technologies such as the systems integration of machines or the introduction of CNC machine tools have, in the German system, effected changes in training contents and in vocational school curricula, and vocational school teachers were forced to adapt as well.

A work-based system is driven by the needs of the employer. The nationwide training standards are determined in a bottom-up process. The companies pay for the system; therefore, they have a say, and rightly so. In a school-based system, in which training

would mostly or even exclusively take place in schools, adaptation to technical change would certainly be much slower, maybe less so because of budgetary contraints that would prevent schools from buying new machines and equipment, but more so because students would be taught what teachers learned ten years ago. A school-based system would also have to be financed by government and then would be run top-down by some government agency. Companies would have far less influence. The system would become more and more removed from the needs of the workplace.

A work-based system is performance-oriented

By its own nature, a work-based system is performance-oriented, as it addresses the needs of the employer. Companies train because they need the high performance worker. They are less interested in the apprentice as a trainee, but are interested in the trained worker, in the outcome of the process. Training is the means to get to that end. Likewise, examinations are performance-oriented, practical and rigorous, and examination requirements change with the performance requirements of the workplace.

In contrast, schools are charged to guide a student through his school years, their task being fulfilled upon graduation. Individual students and society at large reap great benefits from good schooling schools, whereas public schools, unfortunately, draw no material benefit from the later performance of their alumni. In contrast, German companies that train well will harvest the fruits of their seed investment.

The cost of training is high but worth every penny

Training does cost dearly. For 1992, the total expenditure in Germany for equipment, company supervisors, and salaries for apprentices were estimated at $ 27 billion (for 1.6 million apprentices). After subtracting the contribution to their companies' net output of about $ 10 billion, the net cost was $ 17 billion or about $ 11.000 per apprentice. The companies spend 49 % of total apprenticeship expenses on wages (and fringes) for trainees and

39 % on trainers (Table 9). For the country, the pay-off of this expenditure is immediate as youth unemployment and all related problems are mitigated. For industry, this is an investment in the future in securing a qualified pool of labor.

Firms that did not train the German baby boomers in the 1980's will soon, with fewer teenagers available, face shortages, expected to become more severe by the late 1990's when even fewer young people will be available. One statistic says it all: There is an excess demand for apprentices, as, in Germany, 656.000 apprenticeship slots were waiting for 588.000 youngsters in 1993. That is an excess demand of 11.6 %. (The difference between 588.000 applicants and the earlier mentioned number of 572.000 new apprentices in 1993 means that 16.000 applicants did not get the apprenticeship position in a field or region where they wanted it. They could have gotten an apprenticeship in another training area or city.)

Solve the free rider problem with a tax credit

About 35 % of the apprentices leave their companies after certification and go work elsewhere. In those cases, the training company's investment seems to be lost; it is a windfall gain to the company hiring the trained worker. Yet, we have no compensation scheme under which the hiring company compensates the training company for the latter's expenses; so, in effect, the hiring company enjoys a free ride. But this is not a major problem and we do not need a compensation scheme, as, by and large, these moves are cancelling out in a system in which many companies are engaged in training. And many trained people, about two thirds, stay with their companies, at least initially.

A serious free rider problem would, however, exist in a country that wants to emulate the German system and has to start from scratch. At the start of an industry-wide effort when only few companies begin with training, others would snatch up their workers afterwards. Sooner or later, with the fruits of their efforts being enjoyed by the free riders, the industry pioneers

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would give up, and the system would falter. The cost-reward balance would only be preserved if the ex-apprentice would stay with his training firm or once the system is up to scale.

The free rider problem is then best solved by a tax credit to the training company. This tax credit should be generous and cover a large portion of the actual expenditure of the firm: First, the external benefits to the nation (for example, lower youth unemployment) are large; second, to reap these benefits, a nationwide mass training system has to be brought up to scale fast; third, there are substantial start-up costs (training the supervisors); finally, the sooner a nation-wide system is in place, the sooner the tax credit can be reduced or abolished. Therefore, government should give large incentives for a brief time. A tax credit of about $ 5.000 per apprentice and year appears to be appropriate and justified, as it would cover about half of the net cost by German standards, thus underlining the financial burden sharing in this public-private partnership.

The system must not foreclose career options

The vocational training system has to be open. The option of apprentices to go to college after training must not be foreclosed. And also within the companies, skilled workers must be able to rise up through the ranks. This is an absolute must. Hilmar Kopper, the CEO of Deutsche Bank, the largest bank in Germany, does not have a university degree. He joined his bank at age 16 as an apprentice in banking. Werner Niefer, president of Mercedes until 1993, had joined the company as a mechanics apprentice at age 15. Admittedly, these are exceptional cases and both men's careers might have evolved differently without World War II. Most German CEO's are, in fact, academically trained. Yet, interestingly, the incoming CEO of Daimler Benz, Jürgen E. Schrempp, born in 1944, also started as a car mechanic apprentice at age 16; later on, he got an engineering degree.

Apprenticeship is, sometimes, also used as a preparation for the university: 19 % of those German apprentices that have college

entrance qualifications study after their apprenticeship. This is common for students of banking, but also of science and engineering. Engineers with prior training as mechanics or machinists will never get out of touch with the shop floor. German engineers may communicate too little with marketing, but in designing a product they do go back and forth to the shop floor to get a master mechanic's opinion. The qualities of the machinists already become embedded into product design. Production processes and products can be designed knowing that skilled people operate machines. In contrast, when touring American plants one often gets the impression that engineers have designed processes and products knowing that unskilled workers are manning the machines. This always entails a compromise: either product quality suffers or costs are driven up, often both.

Copying or learning from other countries?

If a country wants to start a mass effort in vocational training, it pays to look at successful schemes in other countries. Germany, certainly, is the major, though not only example. Within Europe, Denmark, Austria or Switzerland also have successful systems. And, of course, in Germany there are also problems in keeping the system attractive: An increasing number of young people think they should go to a university and spurn non-academic jobs; labor and teachers' unions want more control for themselves and for government at the cost of employer control over training.

Recent developments of the German training system may offer suggestions and encouragement to countries that, having looked at the German system, become overwhelmed by its details and throw in the towel because they think it cannot be emulated. Trying to copy other countries entails a high risk of failure. It is better to learn from other countries. Concentrating on the main elements or variations on the theme might help. Consider this new development:

The Berufsakademie - an idea for America?

Germany is currently building a new system which combines academic and practical training and fills the gap between traditional vocational training and the university. It is called "Berufsakademie", literally translated "professional academy": The academy is directed at those young people that have college entrance qualifications, yet spurn a demanding or lengthy university education; they want something more practical, but at a higher level than vocational training. Participants of the "Berufsakademie" are taught at an academic, near-university level, but with fewer academic hours. Concurrent with their academic program, they work and are being trained in companies, similar to an apprentice, yet usually in alternating time blocs or quarters: 3 months class work, 4 months in the company. The participants are, during the entire three-year program, company employees, not students doing internships. They go by the rules of employment, not campus life. Notice the dominance of the workplace culture.

Companies soak up the graduates of this program, as they have been trained systematically, are used to the work environment, have academic literacy but less arrogance, and are much younger than university graduates.

I am mentioning this because, maybe - though I am not an expert - the American junior or community college infrastructure could be used as a building bloc for such an approach. While the "professional academy" has, in Germany, been developed as an upscale version of our vocational training system, it might be a vehicle for a downscale development in countries that have a well-developed college system: The graduates of such an academy, being theoretically and practically trained, could become the trainers in a new vocational training system. Another advantage of the "Berufsakademie" is that the high tech jobs of the future - in industrial automation or in health services - often call for people with some academic background.

South East Asia - where else?

The suggestion of the "academy" as a high-powered marriage of academic and vocational training is not a theoretical proposition for other countries: In a variant, it is already practiced in Singapore - who else teaches us high performance lessons other than South East Asia?

1982 marked the start of the German-Singapore Institute (GSI) which calls itself a "teaching factory" under the motto: "We do production for learning; a company does production for earning(s)."

Around 1980, Singapore had recognized that it could not keep growing on the basis of low-cost and low-skilled labor. Neighboring countries, Malaysia or Indonesia, were, with lower wages, beginning to encroach on Singapore's industry. The only way out was the high performance route.

Singapore wanted to attract high tech industries: e.g., robotics/ industrial automation, advanced manufacturing technology using CNC, especially in metal machining and plastic moulding, and design using CAD/CAM. Yet, Singapore neither had the companies (thus, no trainers) nor a vocational training system (thus, no high tech work force) to be an attractive location for international companies in these fields. As a "teaching factory", the German-Singapore Institute was simulating the work environment of the not-yet existing companies. The GSI does contract work on industrial projects for companies, e.g., develop a critical industrial automation segment for a battery producer. Aside from manpower development, GSI also effects technology transfer to Singapore in the high tech areas. (By working with state-of-the-art German machine tools, it is also a great marketing instrument.)

GSI did not try to build up a large workforce for new industries; that would have taken far too long. Instead, it decided to train a select group in an, even by Asian standards, demanding two to

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three year curriculum to become very effective, dual purpose multipliers: Aside from introducing new technologies in new companies, the graduates would then also train new workers. GSI makes high-powered performers out of highly motivated young people. The graduates are strategically placed in new companies locating in Singapore, being economic development "bait" in lieu of other subsidies.

The Singapore example seems to violate the criterion that training must be work-based when, formally, the GSI is some kind of a polytechnic or non-profit factory. The reconciliation is that GSI smells like a factory, operates like a factory, its directors behave like managers rather than teachers, and the agency that had oversight was the Economic Development Board rather than the Ministry of Education. I am sure that GSI would not have succeeded without the absolute dedication that it must simulate a workplace in every respect. As GSI by now is well-established, there is now some assurance that it will keep its performance orientation and workplace culture: If it would slip or side-step, its contract partners in industry would vanish. Success breeds success: An offspring of GSI has just started in Malaysia.

I am telling these stories for two reasons: First, to encourage that you can do it. You can repeat Germany's success in school-to-work transition without reliving all of history from the guilds of the Middle Ages through the industrial revolution. Second, you do not have to copy every detail of the German system: not everything can be transposed on another country and workplace. This may sound like heresy to some German experts that do not see the forest for all the trees, worse yet: if the leaves don't have the structure of a German oak leaf, it can't be a tree, and you'll never get a forest.

It is sufficient to concentrate on three salient criteria, but it is also necessary to fulfill them:

- First, you must have a private-public partnership with clear-cut responsibilities: The training companies must be in the driver's

seat and be willing to lead. The government should have its hands off the steering wheel; it should pave the way by setting national standards and grease the wheels with tax credits and, on the state or local level, provide vocational schools. Chambers of Commerce or other forms of private industry councils should act as catalysts, organizing the joint effort of companies and mediating between the private and public sector.

- Second, the system must be work-based and performance-oriented: in the mix of school-based and work-based learning, two thirds of the apprentice's time should be spent in the workplace. Lacking workplaces, you must simulate them perfectly. Trainees must be treated as employees, not students.

- Third, you must build a system: aim for a system and not for just another program. And bring it up to scale fast with a highly generous tax credit for companies that start training.

In conclusion and in getting back to my beginning, I want to stress that the strength of the German system of vocational training is highest in those occupational fields that cannot be studied at universities. These are the blue collar, skilled industrial and the middle level office and service sector jobs. They fill the huge midfield of our labor force, between the untrained and the academically trained.

It is this area where most of our labor force is employed, and where, given the large number of people involved, we can gain or lose competitive advantage as a country. Second, in addition to generating a highly productive labor force that can command high wages in high performance companies, our system addresses the challenge of a seamless school-to-work transition with high individual benefits to young people and immense benefits for society in the form of avoidance of youth unemployment and related problems.

World-wide, we have a scarcity of countries with a highly skilled labor force. If the other supply side factors of these fortunate few countries are also looking good, they will have growth rates far above the average, since the demand for skilled labor grows more than proportionately with the growth of the economy as a whole. And, having the right labor skills, these countries can sustain high growth rates. Finally, since they provide an economic perspective to a middle class, they will enjoy growth together with political and social stability.

Appendix

School-to-Work Transition and High Performance: The German Approach

Set of tables

Table 1 a

The Dual System
Work-based and school-based training
Chamber as an Intermediary

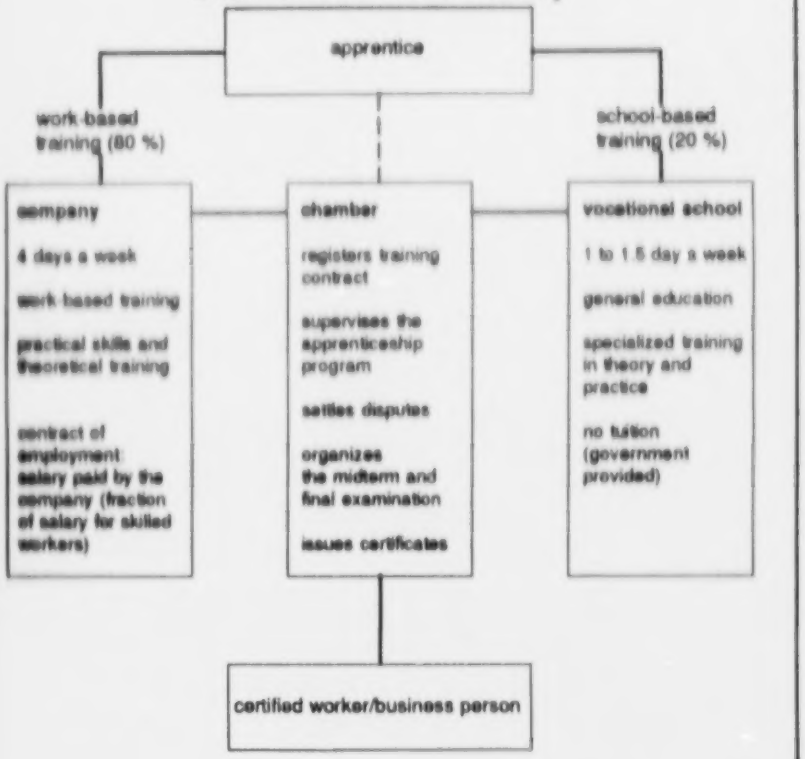

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Table 1 b

The Dual System
How it works

- Industry association and labor union determine the contents/curricula for training; chamber issues specific guidelines;
- company and apprentice conclude training contract; prerequisite for employer: company has to be able to provide training for the entire curriculum, not just a segment; company has to have qualified supervisor for in-house training (e.g., "Meister", office supervisor);
- chamber certifies supervisor, approves training contracts, keeps rolls, oversees training, settles disputes;
- business trains practically and theoretically within the company; advantage: training fits needs of the companies, because apprentices are integrated in the production process and there are no adjustment problems to work environment after the apprenticeship;
- attendance at vocational schools for 1 to 1.5 days a week;
- chamber administers midterm and final examinations; examination board composed of employer, employee representatives and vocational school teachers;
- chamber issues certificates, which are recognized all over Germany and in European Union;
- after some years, certified workers undertake further training leading to "Meister" or a supervisory office position.

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Table 2

Vocational training in the district of the Hannover Chamber

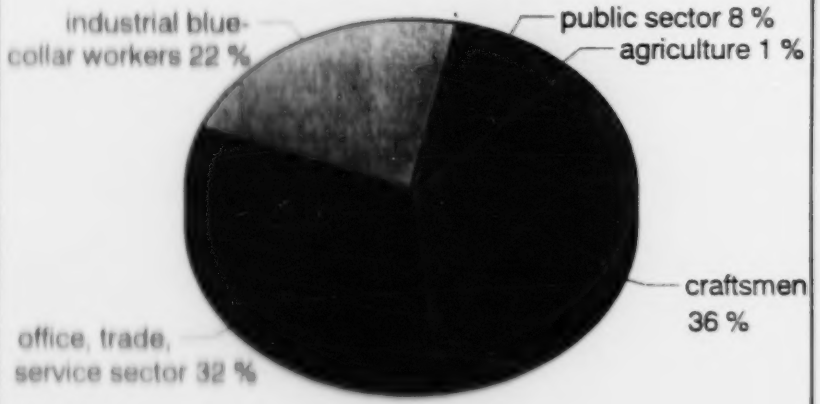
(2.6 mill. inhabitants, 911 000 employees)

1993 data:

- 24 622 apprentices training for 166 different occupations
  - 16 105 in white-collar jobs training for 35 different occupations
  - 8 517 in blue-collar jobs training for 131 different occupations
- 7 400 supervisors (Meister etc.) actively engaged in work based training within the companies.
- 4 832 firms offer apprenticeships.
- 6 000 examiners (2 500 employer, 2 500 employee representatives and 1 000 vocational school teachers) in 645 examination boards.
- 12 429 final examinations
  11 055 passed
  10 600 new training contracts
- The chamber has 33 employees of its total staff of 211 exclusively dealing with the apprenticeship program.

Table 3

595 000 new training contracts in 1992*
for 380 different occupations



Source: BMBW/93

* in 1993: 572 000 new contracts;
decline due to demographic trends

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Table 4 a

A typical white collar training occupation:

Office Assistant
(Bürokaufmann)

- period of training: 3 years
- curriculum for training in company and vocational school includes subjects such as
  - accounting
  - information management (e. g., data processing)
  - statistics
  - personnel management
  - office organization
- after a year and a half written midterm examination
- final examination after 3 years
  - written: 4 hours
  - oral/practical: 2.5 hours
- Training period can be shortend to 2 years for high school graduates.

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Table 4 b

A typical blue collar training occupation:

Industrial Mechanic
specializing in "machinery and systems technology"
(Industriemechaniker, Fachrichtung Maschinen- und Systemtechnik)

- period of training: 3.5 years
- curriculum for training in company and vocational school includes 156 subjects such as:
  - adjust and clamp tools and workpieces,
  - servicing of machine tools and systems,
  - thermal separation,
  - inspect and adjust operations of machines and production systems,
  - industrial safety, environmental care and efficient energy utilization.
- after 2 years written and practical midterm examination
- final examination after 3.5 years
  - written: 6 hours
  - practical: manufacture exam pieces in prescribed time

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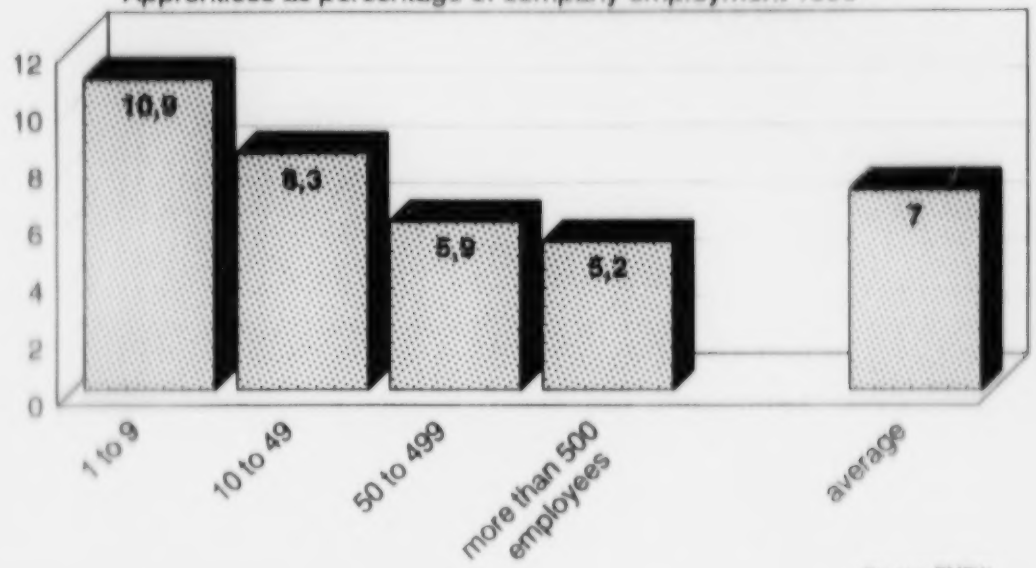
Table 5

Training is done in small and large companies

Apprentices as percentage of company employment 1990



Source: BMBW

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Table 6

The Dual System's Cycle

From school to apprentice to skilled worker to (possibly) supervisor/trainer

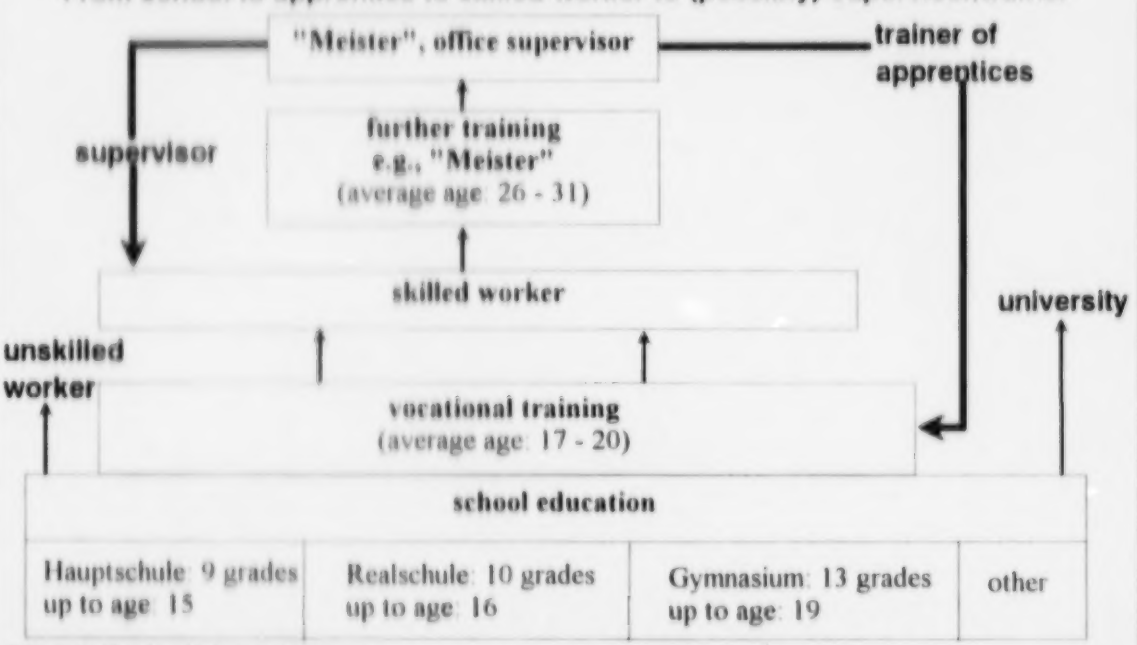

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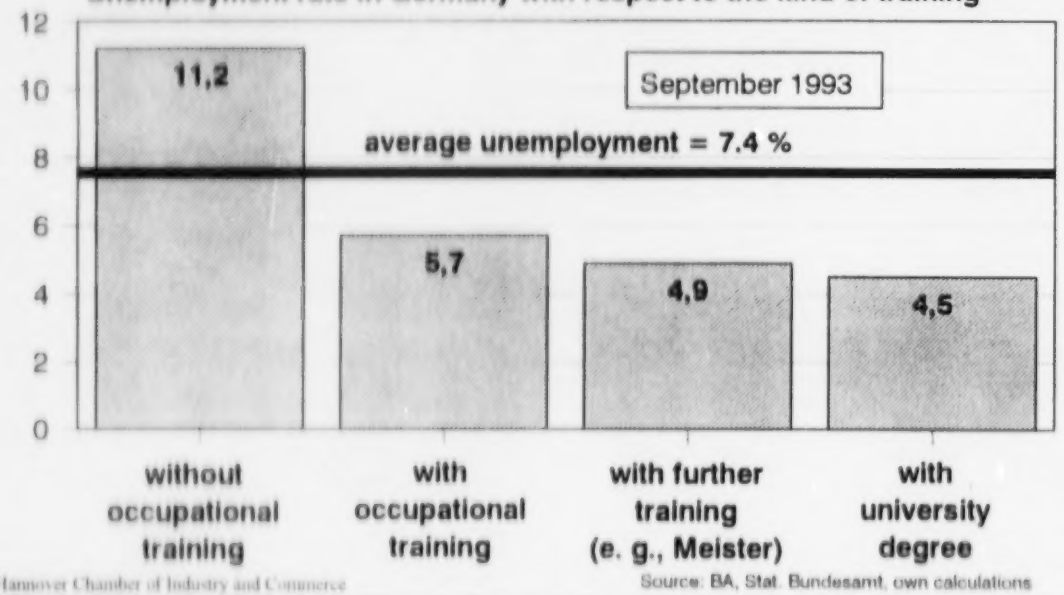
Table 7

Good training is the best unemployment insurance

Unemployment rate in Germany with respect to the kind of training



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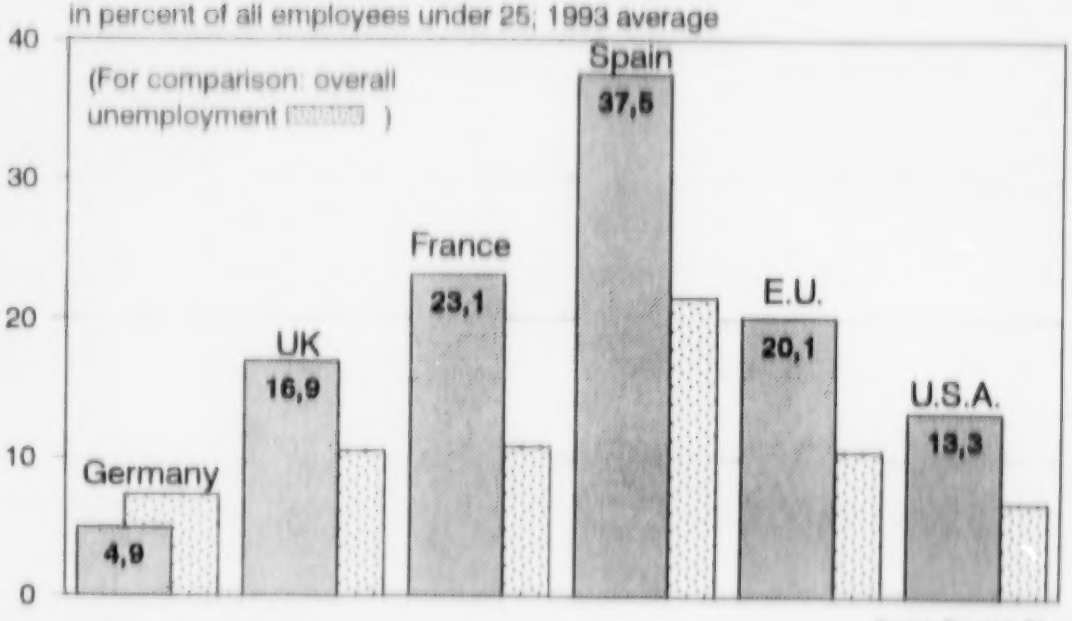
Source: BA, Stat. Bundesamt, own calculations

Table 8

Youth unemployment in 1993

in percent of all employees under 25; 1993 average



Source: Eurostat, BA

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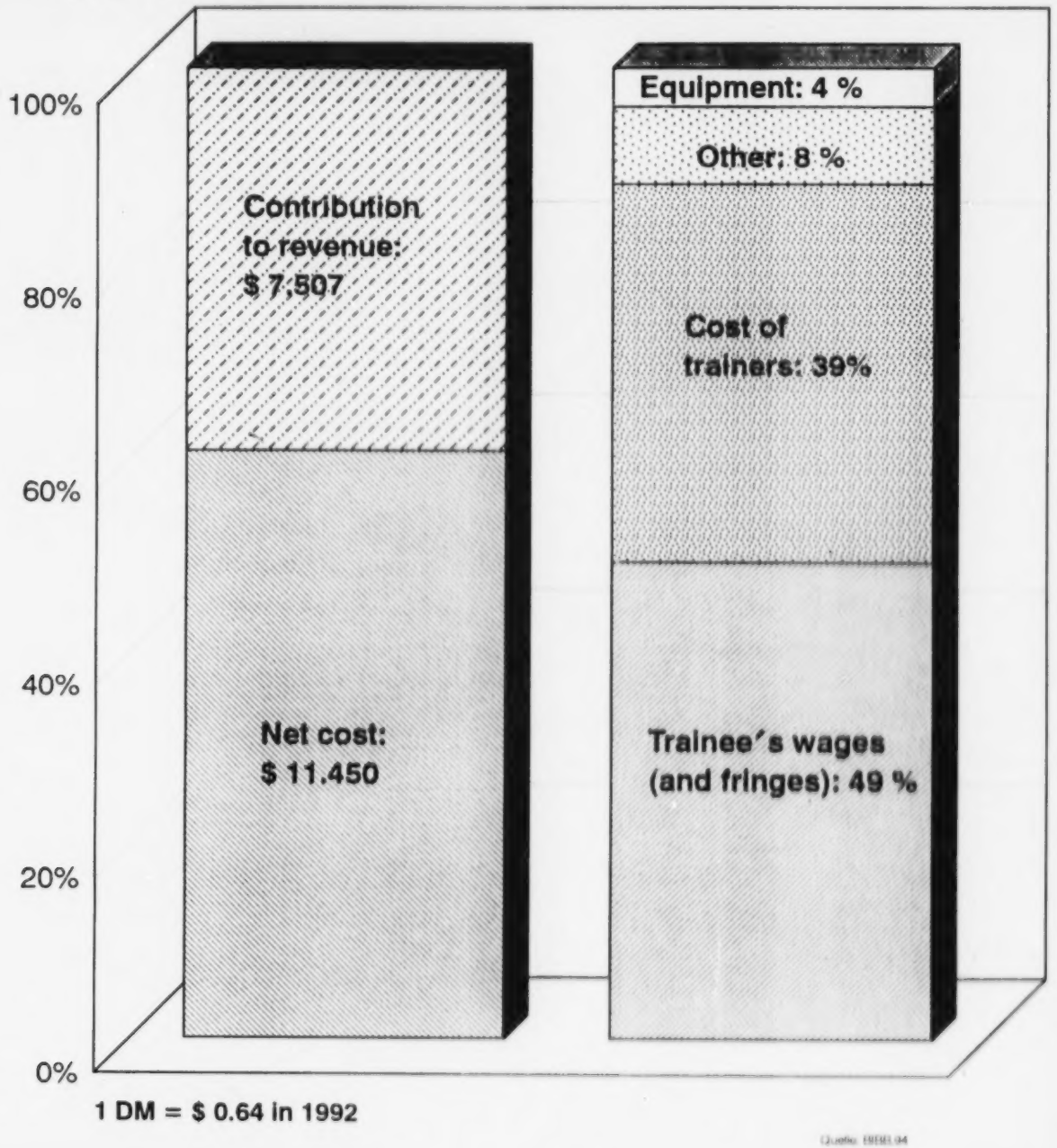
Table 9

Gross and net training cost in Germany

Average gross cost of an apprentice in industry and crafts in 1992: $ 18.957



1 DM = $ 0.64 in 1992

Quelle: BIBB 94

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